

What is claimed is:

1. An image pickup system for tone converting and outputting a color signal of a primary color or a color signal of a complementary color from an image pickup apparatus, the system comprising:

color space converting means for converting the color signal to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

correction coefficient calculating means for calculating a chroma correction coefficient to be used for performing correction on the chroma signal;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal from the color space converting means; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value and the chroma correction

coefficient.

2. An image pickup system for tone converting and outputting a color signal of a primary color or a color signal of a complementary color from an image pickup apparatus, the system comprising:

color space converting means for converting the color signal to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

correction coefficient calculating means for calculating a hue correction coefficient to be used for correcting the hue signal with respect to the hue signal in a predetermined range and for calculating a chroma correction coefficient to be used for correcting the chroma signal with respect to the hue signal in the predetermined range;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal corrected by using the

hue correction coefficient; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value and the chroma correction coefficient.

3. An image pickup system for tone converting and outputting a color signal of a primary color or a color signal of a complementary color from an image pickup apparatus, the system comprising:

color space converting means for converting the color signal to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

first correction coefficient calculating means for calculating a first chroma correction coefficient to be used for performing correction on the chroma signal;

second correction coefficient calculating means for calculating a hue correction coefficient to be used for correcting the hue signal with respect to the hue signal in a predetermined range and for calculating a second chroma correction coefficient to be used for correcting the chroma signal with respect to the hue signal in the predetermined range;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal corrected by using the hue correction coefficient; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value, the first chroma correction coefficient and the second chroma correction coefficient.

4. An image pickup system according to Claim 1, 2 or 3, wherein the color space converting means uses a YCbCr color space or a CIE Lab color space as a color space.

5. An image pickup system according to Claim 1, correction coefficient calculating means comprising at least one of:

chroma suppress means for calculating a chroma correction coefficient based on an edge strength value calculated from the luminance signal;

highlight cyan means for calculating a chroma correction coefficient based on the luminance signal; and

chroma emphasis means for calculating a chroma correction coefficient based on the hue signal.

6. An image pickup system according to Claim 3,
the first correction coefficient calculating means
comprising at least one of:

the chroma suppress means for calculating a first
chroma correction coefficient based on an edge strength
value calculated from the luminance signal;

the highlight cyan means for calculating a first chroma
correction coefficient based on the luminance signal; and

the chroma emphasis means for calculating a first
chroma correction coefficient based on the hue signal.

7. An image pickup system according to Claim 1, 2 or 3,

the maximum chroma calculating means comprising:

recording means for recording a function for
associating a luminance signal and a maximum chroma value
for multiple predetermined hue planes;

searching means for searching two nearest hue planes
adjacent to the hue signal from multiple hue planes recorded
in the recording means;

retrieving means for retrieving functions relating to
the two hue planes searched by the searching means from the
recording means;

calculating means for calculating two maximum chroma
values based on the two functions retrieved by the
retrieving means and the luminance signal;

interpolating means for interpolating and obtaining a

maximum chroma value with respect to the hue signal from the two maximum chroma values.

8. An image pickup system according to Claim 7,

wherein the recording means records a high intensity function for associating a luminance signal having a value equal to or higher than a predetermined intensity value and a maximum chroma value, a low intensity function for associating a luminance signal having a value equal to or lower than the predetermined intensity value and the maximum chroma value with respect to each of the multiple predetermined hue planes, and the predetermined intensity value.

9. An image pickup system according to Claim 7,

wherein the recording means records at least one of a primary function, a polynomial function, a power function and a spline function as the function.

10. An image pickup system according to Claim 7,

wherein the recording means includes hue planes of red, green, blue, cyan, magenta and yellow as the multiple predetermined hue planes.

11. An image pickup system according to Claim 1, 2 or 3,

the maximum chroma calculating means comprising:

table means for recording a maximum chroma value in the color space with respect to the luminance signal and the hue signal.

12. An image pickup system according to Claim 1 or 2,
the chroma correcting means comprising:

ratio calculating means for calculating a ratio between
the first maximum chroma value and the second maximum chroma
value;

multiplying means for multiplying the chroma signal by
the ratio and the chroma correction coefficient; and

limiting means for setting a limit such that the chroma
signal having been multiplied by the ratio and the chroma
correction coefficient by the multiplying means may not
deviate from the second maximum chroma value.

13. An image pickup system according to Claim 3,
the chroma correcting means comprising:

the ratio calculating means for calculating a ratio
between the first maximum chroma value and the second
maximum chroma value;

the multiplying means for multiplying the chroma signal
by the ratio, the first chroma correction coefficient and
the second chroma correction coefficient; and

the limiting means for setting a limit such that the
chroma signal having been multiplied by the ratio, the first
chroma correction coefficient and the second chroma
correction coefficient by the multiplying means may not
deviate from the second maximum chroma value.

14. An image pickup system according to Claim 12 or 13,

the limiting means comprising replacing means for replacing the chroma signal by the second maximum chroma value when the chroma signal from the multiplying means deviates from the second maximum chroma value.

15. An image pickup system according to Claim 12 or 13, the limiting means comprising nonlinear compressing means for, when the chroma signal from the multiplying means exceeds a predetermined threshold value lower than the second maximum chroma value, converting the chroma signal to a value between the second maximum chroma value and the threshold value.

16. An image processing program causing a computer to function as:

color space converting means for converting a color signal of a primary color or a color signal of a complementary color to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

correction coefficient calculating means for calculating a chroma correction coefficient to be used for performing correction on the chroma signal;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect

to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal from the color space converting means; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value and the chroma correction coefficient.

17. An image processing program causing a computer to function as:

color space converting means for converting a color signal of a primary color or a color signal of a complementary color to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

correction coefficient calculating means for calculating a hue correction coefficient to be used for correcting the hue signal with respect to the hue signal in a predetermined range and for calculating a chroma correction coefficient to be used for correcting the chroma signal with respect to the hue signal in the predetermined

range;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal corrected by using the hue correction coefficient; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value and the chroma correction coefficient.

18. An image processing system for causing a computer to function as:

color space converting means for converting a color signal of a primary color or a color signal of a complementary color to signals in a color space having three signals including a luminance signal, a hue signal and a chroma signal;

tone converting means for performing tone conversion on the luminance signal;

first correction coefficient calculating means for calculating a first chroma correction coefficient to be used for performing correction on the chroma signal;

second correction coefficient calculating means for calculating a hue correction coefficient to be used for correcting the hue signal with respect to the hue signal in a predetermined range and for calculating a second chroma correction coefficient to be used for correcting the chroma signal with respect to the hue signal in the predetermined range;

maximum chroma calculating means for calculating a first maximum chroma value in the color space with respect to the luminance signal from the color space converting means and the hue signal from the color space converting means and a second maximum chroma value in the color space with respect to the luminance signal converted by the tone converting means and the hue signal corrected by using the hue correction coefficient; and

chroma correcting means for performing correction on the chroma signal based on the first maximum chroma value, the second maximum chroma value, the first chroma correction coefficient and the second chroma correction coefficient.